

The Work of Disinfection.

STATE DEPARTMENT OF HEALTH OF MAINE.

There has, in the last few years, been a marked change in the practice of the leading and the most efficient health officers in their work of disinfection. It has been in the direction of banishing formaldehyde fumigation and all other sorts of fumigation in room disinfection and the substitution of soap and water applied with the scrubbing brush; boiling things that can be boiled; the use of disinfecting solutions as required, and exposure to air and sunshine.

There are two distinct lines of work in the disinfection of the person who has or has had an infectious disease and the disinfection of his surroundings.

(1) During the course of the illness efficient measures should continually be observed to guard against the carrying of infection from the sick or infectious person and for the prompt destruction of all excretions or other infectious matter so it may not soil or render infectious the things, rooms, or furnishings used or occupied by the patient.

(2) The final disinfection at the termination of the period of illness and convalescence. The more faithfully the first line of work is done, the less the need of the terminal disinfection.

The following are brief directions for carrying out the most important pieces of work when there is need of disinfection. (See "Disinfecting Solutions.")

Discharges from the Nose and Throat.

In a long list of our common infectious diseases—diphtheria, scarlet fever, measles, German measles, whooping cough and others—a precautionary measure of prime importance is to catch and destroy the discharges from the mouth and throat and nose, and thus guard against the smearing of the clothing, the bedding, or anything else with this infectious matter.

The surest way of destroying infection in these discharges is to receive them in burnable spit-cups or on pieces of cloth or paper and burn them. Handkerchiefs or other cloths or clothing which have been soiled with these discharges may be freed from infection by immersion in water or soap and water and boiling for at least 10 minutes. Or,

they may be disinfected by soaking them several hours in the weak formaldehyde solution or the solution of Kreso or Coro-Noleum (Solution 7 or 8).

Discharges from the Bowels.

In another class of diseases—typhoid fever, para-typhoid fever, dysentery, Asiatic cholera—the chief source of infection is in the discharges from the bowels and sometimes in the urine.

These are disinfected with the greatest degree of certainty by means of heat. Into the vessel into which the discharge has been received, pour a quantity of boiling water at least 5 or 6 times that of the matter to be disinfected. Let it stand until cold. Failure to disinfect in this way may result if there is too rapid cooling of the vessel and its contents.

Or, a solution of chloride of lime (Solution 4), or Solution 8 may be used for this purpose, or Solution 7, double strength, adding to the excreta a quantity of one of these solutions at least twice as large as the volume of the discharge, and if Solution 4 is used, four or five times the quantity. Before the final disposal, the disinfectant should act three or four hours at least—the longer the better, and there must have been a very thorough mixing of the disinfectant and the material to be disinfected.

Hands.

The hands of the attendant upon the sick should be carefully cleansed after every handling of the patient or of infectious matter or infected things. Wash thoroughly with soap and water and then rinse the hands in clean water; but it is still better after washing the hands to soak them for one full minute at least in a disinfecting solution, Solution 8, preferably.

Disinfecting Bath for the Patient.

This is desirable for the patient who has had smallpox, scarlet fever, or other of the more serious of the infectious diseases before he is released from quarantine.

This disinfection of the patient may be by means of a sponge bath applied with a wash cloth or bathing cloth wet in Solution 8, one-half strength, or in a solution made by dissolving one tablet of bichloride of mercury (corrosive sublimate) in three pints of water.

The bichloride solution must not be made nor used in metallic vessels. The hair of a person receiving a disinfecting bath should be well moistened to the scalp.

Eating Utensils.

Disinfect forks, spoons, cups and all other eating utensils used by the sick one or carried from the room, by immersion in boiling water for 10 minutes or so. If that cannot be done, let them remain in Solution 7 or 8 twice as long.

Cotton and Linen Clothing.

Boil for at least ten minutes or soak in Solution 7 or 8. The clothing should remain in the solution ten or twelve hours and then be washed.

Woolen Clothing.

May be subjected to steam disinfection, or may be sprinkled plentifully with formaldehyde solution, and wrapped in a rubber blanket.

Steam disinfection can be done in the common wash boiler by supporting, above the water with two bricks or otherwise, a false flooring of lath or thin board. Pour in two or three inches of water, place the articles to be disinfected above the false flooring, put on the cover and steam one hour after the water begins to boil, keeping the water briskly boiling all the time. Replenish with more boiling water if necessary. Woolen clothing or cotton and wool fabrics which would be shrunk by boiling are not so badly injured by steam disinfection.

Bedding.

Throw straw beds out of the window. Empty out and burn straw. Then disinfect the tick as for cotton clothing. Disinfect feather beds, pillows, quilts, comforters, and blankets by steam disinfection when practicable, or if not soiled, with formaldehyde in large doses. Bed blankets, quilts, spreads and comforters, may be disinfected as for woolen clothing.

Rugs and Carpets.

It is important to disinfect these carefully. Small and moderate-sized rugs should be piled several in a pile and each sprinkled or sprayed plentifully with Solution 7 as it is laid in place. Then roll all together tightly and tie up the roll with twine at each end of the roll. Large rugs and carpets may be sprayed or sprinkled well or scrubbed thoroughly with a brush or broom dipped frequently into Solution 7 or 8. Then air out well with out-door exposure to the sunshine if practicable.

Lounges, Couches and Other Upholstered Furniture.

Scrub with Solution 7 or 8, using for the application of the disinfectant a hand-cloth or towel squeezed out after immersion in the solution, or a large brush dipped very frequently into the solution. Then, if practicable, expose to the direct outdoor sunshine a day or two.

Floors, Walls and Other Surfaces.

Floors may be scrubbed with Solution 7 or 8. If it is an old, loose floor the application should be plentiful enough to saturate the dust in the cracks.

The washing or wiping of walls or the surfaces of furniture with cloths wrung from a disinfecting solution—No. 7 or 8, suffices. Walls need no treatment unless infectious hands or excretions have reached them. If Solutions 7 or 8 are not available the scrubbing may be done with hot water and soap.

The Sick Room (A Preliminary Fumigation).

This should never be considered so essential a part of the work of disinfection as the methods described in the preceding paragraphs, and after this fumigation those other processes should be carried out as fully and carefully as is possible.

The first consideration should be arrangements for suspending, with no overlapping or folding, the blankets, quilts and other parts of the bedding and clothing which can be hung up. The way we may do this must vary somewhat with the differing conditions found in rooms; but the following may serve as a general statement of what may be done.

Look for windows and doors which are upon opposite sides of the room. From each end of a window-cap and from the center if need be, insert, with the householder's permission, a screw-eye (wire about one-eighth inch in diameter). Put screw-eyes similarly into the cap of a door or window upon the other side of the room. Through the screw-eyes run lines of hempen twine two-sixteenths or three-sixteenths of an inch in diameter. If need be, and if practicable, stretch a larger number of lines than the two or three.

For the suspension of the small articles, three or four lines may be stretched from the headboard to the footboard of the bedstead. The mattress should be left wholly uncovered.

Clothing and the lighter bedding in other rooms which may have been infected may also be suspended in the one room which is to be fumigated.

Upon the line nearest to the door from which the disinfectant is to escape, reserve a space for the suspension of a bed sheet, whole size. With all openings in the room tightly closed, the operator sprays upon the sheet all the full-strength formaldehyde (formalin) the sheet will hold without dripping much, a pint or more. If the room has much more than 1000 cubic feet of space, two sheets should be used.

The sprayer must be one which will distribute evenly the full quantity of formaldehyde solution upon the sheet in a very few seconds. Every health officer should have such sprayer and should keep on hand screw-eyes and heavy twine to be used in this kind of work.

Privy Vaults.

Solution 4 or milk of lime (Solution 5) may be used for this purpose. Gallon after gallon should be applied until the contents of the vault are saturated. Then after cleaning out and carting away, the whole inside surface of the vault or the ground should again be thoroughly saturated with the disinfectant.

Camps and Shacks.

Camps and other loosely-built structures require special treatment. In a lumber camp, for example, the boughs, straw, or other material serving as a substitute for mattresses should be cleaned out and burned. The blankets or spreads, stretched out their full length, should be slowly rolled by one person while another sprinkles them plentifully with Solution 7, preferably. If that is not available, the bichloride solution (Solution 6) or Solution 8 may be used. After the rolling of the spread is completed, it should be tied up and wrapped in a rubber blanket or other impermeable fabric if available. If it is not it should be tied tightly and the outer surface saturated with the solution.

The camps themselves should be disinfected by spraying very plentifully their walls with Solution 7 or 8 and sprinkling or spraying the floors so plentifully that the wooden or earthen floor is well wetted and that the dust and dirt in the cracks of wooden floors is completely saturated with the solution.

The clothing and other articles found in camps may be disinfected in accordance with the directions which have already been given for the disinfection of such articles.

DISINFECTING AGENCIES AND PROCESSES.

The work of disinfection may be done by means of physical agencies or chemical agents. The following are brief references to some of these disinfecting agents and processes.

Heat.

By burning infected articles or by boiling them in water, infection may be destroyed with certainty. Steam disinfection is just as trustworthy when intelligently done.

Burning.

The destruction by burning is an absolutely certain method (See "Discharges from the Nose and Throat"). It is sometimes necessary to have infected articles burned when such articles are of but little value and cannot be disinfected in a trustworthy way.

Boiling.

Cotton and woolen fabrics—handkerchiefs, towels, personal clothing and bed clothing—are disinfected with the greatest degree of certainty by immersion in water or soap suds and then boiling for not less than ten minutes. The water must be actually boiling for that length of time. Spoons, forks, and other eating utensils are also the most effectively disinfected by immersion for a few minutes in boiling water.

The Scrubbing Brush.

A thorough scrubbing with soap and water goes quite a long way in the work of disinfecting floors, walls, doors, furniture and other things to which this method of cleansing can be applied. Still more trustworthy is a washing which not only cleanses, but applies, at the same time, a chemical germicide of known value, Solution 6, Solution 7 or Solution 8, for instance.

Sunlight.

Direct sunlight outdoors in uncovered areas is rapidly destructive of disease germs. Indoors for the disinfection of rooms and their contents the light which is available is of far lower intensity and is limited in its germicidal powers. Exposure to the sunshine is desirable as supplementary to other processes of disinfection; for instance, rugs, carpets or upholstered furniture that have been disinfected as efficiently as is practicable by chemical agencies may be placed outdoors in the direct sunshine for a few days following their indoor disinfection.

Formaldehyde.

Formaldehyde fumigation by the liberation of the gas through the action of permanganate of potassium is now impracticable for the reason that the price of permanganate is prohibitive. A large variety of formaldehyde candles and lamps are upon the market but with none of these can the whole quantity of gas be liberated in a very few minutes as it must be to give the best results. None of these devices present efficient processes for room disinfection or for general disinfection.

The sheet method described in this circular should be ranked merely as an auxiliary in the work of cleaning and disinfecting at the termination of a case of infectious disease.

Formaldehyde Solution.

The commercial 40 per cent. solution of formaldehyde, rarely up to that strength, is too strong for general use as a disinfecting solution; but, diluted about one part to 20 parts of water (Solution 7), it is very efficient as a wash for

furniture, woodwork, and other things; for scrubbing floors, walls, carpets, rugs, and woolen clothing; and for soaking all linens or other washable fabrics. It may also be used for the disinfection of sputum and discharges from the bowels.

Sulphur Fumigation.

This is not an efficient method of destroying bacteria but the gas which is given off is very poisonous to all forms of animal life, high or low. It is, therefore, of special value as a method of destroying rats, mice, flies, fleas, and mosquitoes as carriers of infectious diseases and of destroying various other insect household pests.

The sulphur used may be either the flowers of sulphur or sticks or rolls of brimstone which have been crushed into a powder. It should be burned in shallow pots or pans which are placed in tubs of water, preferably covered with wire screen to catch any of the burning sulphur which may pop out. The sulphur may be lighted by means of hot coals but by far the most trustworthy way is to light it with alcohol—grain alcohol or wood alcohol. Hollow the sulphur out in the center and soak liberally with alcohol and then ignite it. When used for the destruction of insects, two pounds per 1000 cubic feet of space is sufficient with an exposure of from four to six hours.

It should be borne in mind in resorting to sulphur fumigation that wall papers, clothing or other fabrics colored with dyes of vegetable origin or with many of the analine dyes are bleached. It attacks most metals and lessens the tensile strength of various fabrics.

Carbolic Acid (Phenol).

The use of carbolic acid as a household disinfectant or remedy should be discouraged on account of its dangerously poisonous qualities. Neither should the health officer be encouraged to include it among his disinfecting agents for the reason of its extremely high cost at the present time and for the additional reason that it is very much outranked by some of the other chemical disinfectants which, while more efficient germicides, are not nearly so dangerously poisonous when accidentally swallowed.

Kreso, Etc.

The investigations which have been carried on in the hygienic laboratory of the Surgeon General of the Public Health Service in Washington have shown that Kreso, Coro-Noleum, and some of the other proprietary disinfectants are very efficient, more so than carbolic acid. But no disinfectant of this kind should be used unless, upon the bottle or other container, there is a plain statement of the carbolic acid (phenol) coefficient of the product. The figure which represents its coefficient indicates how many times stronger